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Patent Application

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Air sterilization and purification apparatus

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 Domicile:

5. List of Appended Documents

(1) Specification	1 set
(2) Drawings	1 set
(3) Duplicate Copy of Application	1 set
(4) Power of Attorney	1 set Method Examination
(5) Request for Examination	1 set

[illegible stamp]

Specification

1. Name of the Invention: Air Sterilization and Purification Apparatus

2. Scope of Patent Claims

In an air purification apparatus that passes positively charged airborne dust between opposing electrodes, an air sterilization and purification apparatus wherein air is caused to pass through while inducing a separation phenomenon by switching the direction of flow of air that passes through the aforementioned opposing electrodes and modifying a cross section of the passage.

3. Detailed Description of the Invention

The invention of the present application is one that relates to an air sterilization and purification apparatus, and in a purification device that causes airborne dust particles to be absorbed by static electricity, relates to a device capable of raising dust removal effectiveness, and is intended to achieve an air sterilization and purification apparatus that, in particular, is made up of a combination of novel and ever simpler elements, is manufactured by a simple process with lower costs of production, and that, with excellent safety, is capable of achieving even better results in use.

Along with the development of heavy industry, air pollution from sources at each stage of the production process, nitrous oxide and sulfur dioxide emitted from transportation sources, and heavy metal particulates, have steadily increased. The widespread expansion of pollution has become an issue of serious concern to society, and various regulations have been proposed to prevent pollution, including preventing the generation of toxic materials as well as the strengthening of emissions standards. These approaches, however, cannot be considered adequate, and there are a growing number of people who suffer from lung cancer and other cancers as well as an increase in the number of people suffering from asthma. Air purifiers have become a common and indispensable part of life and are to be found installed in homes and sickrooms to prevent and/or treat these illnesses, and are used as prevention or treatment devices in the production stages of sanitary pharmaceuticals, foods, devices, and are also employed in the production of precision machinery.

A variety of devices have been suggested to cleanse the air by removing airborne toxic materials. Among those are air purifiers that use filter materials in air flow passageways to physically collect the dust, or electrical air purification devices such as dust removers that make use of static electricity or infrared rays to disinfect the air, or a combination of any of these approaches in order to remove toxic materials.

Among these, suggestions for conventional devices based on the aforementioned use of static electricity are known, including, for example, (a) an approach utilizing centrifugal force designed such that air, induced from an air inlet, passes through an ionization element while electrical voltage is applied to the inner and outer cylinders while the inner cylinder rotates, moving the air between the inner and outer cylinders, and (b) an approach where, in the above configuration, the outer circumference of an inner cylinder has inclined guide vanes provided in the axial direction along the outer circumference of the inner cylinder and rotational movement is applied to the air as it passes through between the inner and outer cylinders to make use of centrifugal force.

The above mentioned approaches have attempted combined dust collection by the use of electrostatic migration and centrifugal force, however, because high voltages with 11 KV in between the inner and outer cylinders, and as a result of rotating the induced air, a rectified electricity may be generated due to frictional resistance depending upon the air flow rate, and electric discharge sparks may occur between the dust particles that have collected onto the external cylinder, frequently causing risk of electrocution as well as the increased production of ozone and possible malfunction of the device.

In view of the above, research conducted by the inventors of the present application have overcome and eliminated the well known defects described above, and have perfected a device that is superior in terms of safety and that markedly increases the efficiency with which dust is adsorbed. The invention comprises a fan motor; an inner cylindrical electrode that has a

built-in high-voltage transformer, and that is connected to the positive side; a high voltage cap connected to the negative side; an external cylindrical electrode that is earthed; and a housing that has openings on both sides, and that is supported by a pedestal. On occasion that airborne dust that is guided into the unit through the upper inlet passes through an ionization section high-voltage cap that is connected on the negative side, a positive charge is applied to the dust, and it is guided into the electrostatic field between the grounded outer cylindrical electrode and the positive inner cylindrical electrode, and as a result of the electrostatic induction effect, airborne dust passing through is adsorbed onto the surface of the outer cylindrical electrode. Thus, the present invention is characterized by having opposing electrodes that have a plurality of parallel curved surfaces and a plurality of convex curved surfaces or recessed curved surfaces on the inner cylinder and an outer cylinder provided with a plurality of parallel curved surfaces and a plurality of convex curved surfaces or recessed surfaces, wherein the convex curved surfaces or recessed surfaces of the inner cylinder and the convex surfaces or recessed surfaces of the outer cylinder alternate with each other. By creating an electrostatic field between these opposing cylinders, the direction of the flow of air passing through them can be alternated, and the flow passageway cross section can be altered so that the flow rate fluctuates, thereby creating a flow separation phenomenon. This causes the generation of a stagnant flow, a reverse flow, or a turbulent flow of air that contains dust. The intention here is to extend the duration of the effect of the electrostatic adsorption on the outer cylindrical electrode surface and to increase in the efficiency of dust removal. The next object of this invention is to provide a device with superior safety. Additionally, an object of the invention is to provide a simple and compact mechanism that can be made available at low cost and that can be placed easily in a variety of locations, as well as to provide a device that allows simple, easy, and safe cleaning of the panel upon which the dust has been adsorbed. Other objects and characteristics of the present invention can be understood from the following explanation.

In Figs. 1 through 5, a housing acceptor cylinder (5) is supported on a stand (1) by means of a shaft (2) upon which a support board (4) consisting of insulating material and provided with exhaust windows (3); an external cylinder accepting cylinder (7) is mounted on the edge of the lower opening section of said housing; an exhaust windows (6) is arranged in the external cylinder barrel (7); and a fan motor (8) is internally installed in a motor cap (9). The fan motor (8) (for practical purposes, preferably with a maximum torque of $1040 \pm 10\%$) is connected to a power source, and the motor cap (9) has a built-in high-voltage transformer (11) that is connected to a power source. An inner tube electrode (14) made of metal and provided with stepwise alternating vertical curved surfaces (12) and convex curved surfaces (13) is installed onto the positive side of the high-voltage transformer, and a rounded-head inner cap (16) made of insulating material and continuing the multiple outer cylinder support [illegible] (15), (15) is mounted in the top opening of this inner cylindrical electrode (14). A metallic high voltage cap (18) that is provided with a limit switch (17) is installed in this cap (16) and connected to the negative side of the high-voltage transformer and a metallic outer cylindrical electrode (22) provided with stepwise alternating vertical curved surfaces (20) and recessed curved surfaces (21) on the upper opening edge step section (19) of the outer cylinder acceptor (7). The vertical arced surfaces (20) and the recessed arced surfaces (21) are positioned so as to face the swelling arced surfaces (12) on the inner cylindrical electrode (14) and the vertical arced surfaces (12) on the inner cylindrical electrode (14) with each other, respectively. The external cylindrical electrode (22) faces the inner cylindrical electrode (14). According to FIG. 1, an air inlet window (23) is arranged in the upper opening of the external cylindrical electrode (22), and a retainer plate (25) made of insulating material is provided on the bottom limit switch retainer element (24). Next,

the housing (27) is installed on the upper opening of the outer perimeter section (26) of the housing acceptor cylinder (5), which is installed on the support board (4). A head section retaining cylinder (28) is installed at the top section of this opening, and an air inlet window (29) is provided in this upper opening and a connector board (31) made of insulating material and provided with dust-proof mesh/screen (30) that is connected by means of bolts (32) to the retainer plate (25), air inlet windows (29), and air inlet windows (23), and is configured so that air passes between the inner and outer electrodes, the exhaust windows (6), and the exhaust windows (3), and is circulated to the outside when the fan motor (8) is operating.

At this time, when the high voltage transformer (11) and power source are connected by a switch, which is separately arranged (in practical terms, an input voltage of 100 V AC and output voltage of 7 KV DC are preferable) the airborne dust that is introduced [into the unit] is positively charged in the vicinity of the transformer (11), by the inner cylindrical electrode (14) that has been connected to the positive side by means of the electrostatic induction between the inner and outer electrodes, and is migrated to the external cylindrical electrodes (22) and clung to its walls.

Here, the direction of the air flow that is passing through the convex curved surfaces (12) and vertical curved surfaces (13) provided on the inner cylindrical electrode (14) is switched by the vertical curved surfaces (20) and recessed curved surfaces (21) provided on the outer cylindrical electrodes (22), and as a result of the change in the cross section layer between these electrodes, the spacing between the vertical curved surfaces (12), (20) of both electrodes should be approximately 20 mm; the spacing between the vertical curved surfaces (21) on the outer cylindrical electrodes (22) and the convex surfaces (13) on the inner cylindrical electrodes (14) should be approximately 16 mm; and the spacing between the recessed curved surfaces (21) on the outer cylindrical electrodes (22) and the vertical curved surfaces (12) on the inner cylindrical electrode (14) should be approximately 25 mm, for practical purposes. The recessed curved surfaces (21) should be 5 mm in diameter, while the convex curved surfaces (13) should be 4 mm in diameter. There is a change in flow rate, and the separation phenomenon is augmented. As a result, the dust-bearing air flow stagnates, reverses or becomes turbulent, thereby extending the duration for electrostatic adsorption and increasing dust collection efficiency (Fig. 6).

In the cross sectional configuration of the above mentioned both electrodes described above, in another embodiment, the convex curved surfaces (13) of the inner cylindrical electrodes (14) could have a gentle linear flow [illegible] convex curved surfaces (13) on the upstream side to intensify the switching of the direction of flow and the change in the flow passageway cross section, making it that much easier for the separation phenomenon to occur, forming lead (33) between the convex curved surfaces (13), (13) for a configuration that augments electrostatic induction. (Fig. 7)

Moreover, as a separate embodiment, convex curved surfaces (34) with gentle flow lines are formed on the upstream side of the outer cylindrical electrodes (22), and both flow line convex curved surfaces (34) and flow line convex curved surfaces (35) are positioned so they oppose one another, thereby intensifying the switching of the direction of flow and the change in the flow passageway cross section, extending the duration in which adsorption occurs due to stagnation, reverse flow, and turbulent flow of the dust-containing air (Fig. 8).

With regard to removal of dust clung onto the surfaces of the outer cylindrical electrodes, the power to electrode (22) is removed along with the retainer plate (25) by removing the connector board (31) and by pulling up and removing the head section retaining cylinder (28) and the housing (27), and after cleaning these, it is easy to restore them to their original state and join together. At this time, the retainer element (24) of the retainer plate (25) is separated from the limit switch

(17), thereby breaking off the flow of current between the high-voltage transformer (11) and the power source, so that there is no risk of electrocution.

As configured above, the present invention extends the duration of the cling effect on the outer cylindrical electrode by means of electrostatic induction of the dust-carrying air that passes between the electrodes, thereby increasing the efficiency of dust removal and reducing mold spores and yeast fungus.

Moreover, this is a particularly safe device since there is no danger that frictional force and resulting rectified electricity will be generated as a result of centrifugal force as the air passes through the unit, and the risk of malfunction due to sparking electric discharge between the adsorbed dust particles resulting in electrocution or explosion can be prevented, and the generation of ozone can be suppressed.

Also, given the device's simple and compact configuration, it can be manufactured less expensively, and it is also easy to move.

4. Brief Description of the Drawings

Figure 1 is a front view. Figure 2 is a plan view. Figure 3 is a view of the bottom surface. Figure 4 is a cross-sectional view along the A-A line in Figure 1. Figure 5 is a cross-sectional view along the B-B line in Figure 1. Figure 6 is an enlarged view of the area indicated by the letter E in Figure 4. Figure 7 is an enlarged flow line cross section diagram of another embodiment. Figure 8 is an enlarged flow line cross section diagram of yet another embodiment.

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Agent: Hiraki MIURA [seal]

(4)

特許願

特許厅長官 年 月 日
 1. 美術の名称 金属製音楽盒
 2. 類別番号 甲第4類 昭和51年2月6日登録
 3. 特許申請人 住 所 〒107-002
 4. 代理人 住 所 〒107-002
 5. 登録料金の目録
 (1) 明細書 1通
 (2) 図面 1通
 (3) 説明書 1通
 (4) 契約状 1通
 (5) 送付料 1通
 50 010050

②日本国特許庁
公開特許公報

①特開昭 51-90077
 ②公開日 昭51(1976) 8. 6
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 審査請求 有 (全5頁)
 厅内整理番号
 7003 f1

②日本分類
 72 C4
 ③IPC
 B03C 1/40

て現れされる大変行楽機として利用されるに至りて
 開拓される出来事化する。レコード取扱いとく楽器子
 児の又多見先生の新興機の研究はナオミが実現を
 し、またもして新興機とより社会文化開拓をして
 大きく取り上げられており、大変の力作開拓につ
 いて諸々の注目が寄せられ、有志の先生の
 子供たちが新興機が実現されば大いにセイ尤
 フと叫びえず、大変開拓に至る新興機その他のア
 ナログ又はデジタル方式の新興機の存在である。記
 載新興機は、上記開拓の子供たちには開拓上実現
 が可能でないは開拓に難済し、子供、労働者等
 として現いは又開拓上問題、大変、せんそこの度を
 実現をみて立ち止り、新興機の開拓改修をな
 して普及し、先端上不可欠の開拓とをつぶ。

そこで、工業やの新興機を研究して新興機の
 大きな開拓改修を実現され、そのしくみが新興機
 の開拓改修において何をば、達成が可利用の新興機
 に開拓するものか及び新興機開拓により又新興機
 をしきるものかは新興機を開拓する新興機を用いて新興機を開拓する
 やはり新興機に開拓する新興機その名上に新興機の開

明細書

2. 発明の名称 金属製音楽盒
 3. 特許請求の範囲
 本発明をねだられた技術の範囲に限ること。
 本技術を構成する構造を含むようにした本技術が能
 効にされて、上記開拓する新興機を通過する空間
 の開拓方法を構成させ。本口技術の新興機を構成
 させることによつて、新興機まで開拓させながら工
 作を容易にしめるようにしたことを特徴とする新
 興機構成装置。

4. 発明の詳細な説明

本開拓の新興機、新興機構成装置を構成して、開拓
 中のふんじんを特定層により飛躍せしめる新興機
 が構成されて、その新興機構成装置によるととのど
 うに構成されし、とくに新興機で一層飛躍せしめる場合
 がある。両半で工作とより速い飛躍度を以て生
 成され、かつ飛躍度に飛れ、より速い飛躍度を
 有することができる新興機構成装置を構成する
 ものである。

新興機構成装置は、新興機構成装置に

合せ部分によって有害物質を除去せんとする機器がされている。

立地、施設設備充実に堪へ西端の駅では、何處も、初、立派入口から入る大堂は、電車駅舎を抜つて、可笑間に電車が止まれる事の所外構造を、内装の作りを廻りしまだ落成するより、未だ地盤工事を終了する建築、料、上層の構造にかれて、内装の内装は、既に完成して外側は、まだ地盤工事が、立派なこの外構造開拓の方法を適用する間に既に既に運営を方々される立派な地盤工事を利用する建築がお知られていふ。

血口の氣勢は、貴様殿の威勢力と強少力との相乘作用を發揮したものであるが、通常の外見では見えないが、本質を察し、深入研究を経てその結果、工芸の表現によつては外見が現れ、ついで表面現れを生じ、終局に内観され完璧化される。しかしは現れゆかせれがち)。・スオゾンの出生を以てスレオゾン風を始め前半上昇しくなる。又しばしば表面を生ずる事の大風をかれをもつたので飛躍化が困難でもつた

次に御用事はさうした事務の運営を終了し、
ナニ。

おまへの御心をいた。女御の上より御用をオして更衣室ある御用室御室を此處に御用室から改め実業能幹に、ハラシナタ御用室を改めし、故ヘロ

卷之三

クシノ内閣の下で万能の政治家に、内閣官(1)を
受けた先は政界で山を越えて大外相又財政大臣、そ
の上万円にファンタジーの財政の新元年の大財
からなるヨートヘルヤップ時代を度し、ファンセ
ートヘルト大財政に就任大トヘルヨードヌキト
・ヨードヌキレーツを毎日に繰り返すとヒカヌビ、ヨ
ドヘルヤップ時代は萬葉歌時代に相應したか
然キラル(12)を度し、日本に萬葉歌時代の
と呼ぶ萬葉歌(13)と七段詠歌が萬葉正に受けたや成る。
万葉歌(14)を萬葉トランスの五の曲の歌として
歌し、万葉歌を萬葉のヨードヌキロヨロハに呼應
とし萬葉の外國文文献(15)を度し大外相兼
務大臣を万葉音ナツアブ(16)を度して、ヨドナツ
アブヨドナツアブナツアブナツアブ(17)を度して、ヨドナツ
アブヨドナツアブナツアブナツアブ(18)を度して、ヨドナツ
アブヨドナツアブナツアブナツアブ(19)を度して、ヨドナツ
アブヨドナツアブナツアブナツアブ(20)を度して、ヨドナツ
アブヨドナツアブナツアブナツアブ(21)を度して、ヨドナツ
アブヨドナツアブナツアブナツアブ(22)を度して、ヨドナツ

(4)は西口又は山の東側通路(43)を互いに内側
するより左側を歩かれて、内側道路(41)と同様さ
せて奥走り太上、その上方開口部に取扱室(43)を
見え、下側ドアミストスイッチの昇降装置(44)を
行なうる時は左側を歩き右側通路(43)を左折し、
左に前記支度風向表示板を左へキランク段階間の
上方向の開口部(41)にてナシング(45)を抜ぬ
し、その上方開口部に取扱室(43)を経過して太
上、その上方の開口部に取扱室(43)を抜けた上で開
口部にて右折した内側本体中央左側の運転席(43)
を右折し、ホールド用ヒンジをして前立柱(46)を退
けし、右側日除れをしめ、ファンヒートルームを行
く際、又は運転室(43)から前立柱(46)の取
扱室(43)へ立柱(46)より、門、外側車両間を通
じて、前立柱(46)、側面立柱(46)及び前立柱(46)の取
扱室(43)とする。

上記両年齢の雌成虫について、飛出実験河として、内河支流(33)の雄成虫と同様の上流域を被ふる支流(34)とし、それ支流の雌成虫とが、飛出実験河の成虫を交差し、雌成虫を一度帰郷するとともに死んだ。雄成虫は支流(33)(34)に寄生(34)を経過して雌成虫を産する結果となつたと/orできる。(表二四)

また、外側を複数に重ねた大ぶんじんの被子
に因っては、表面は均等に温かさを保ち難い。頭部が
足部よりヒートラング(熱)を上昇して吸い取
られ、上へ移る(逆)とともに外側を離す(熱を逃す)。
被子構造は、被子に着てゆきやすくなる。

第回 851-90976 (3)
は、西田ヤン元山の御代に於いて之の御内
・舟され、内田洋蔵御内に於いて御内御内と
・御内御内とし内田洋蔵(山本義徳さん)が御内
(33)に現れましたので御内御内である。

この間、内閣官房は(1)に於け大蔵省貿易課(2)と
通商省貿易課(3)、外務省(4)に於け元勧業課
(5)と内務省貿易課(6)と於て、支那の通商手
法規の万國公認を乞ひしもの。その内閣官
房の通商課(7)は内務省貿易課(6)の通商手
(2)の通商法第20条、外務省(4)の通商手
(2)と内務省貿易課(6)の通商手(2)との通商法
20条、外務省(4)の通商手(2)と内務省
貿易課(6)の通商手(2)との通商法第20条とすると
と、即ちその内閣官房(1)は大蔵省(2)、通商省(3)、
外務省(4)とするとことと爲えし。即ち大蔵省(2)
にて經濟が実現し、丸九の通商政策を達成するの
上より、これがより容易な通商法の達成の手筋、即
ち大蔵の通商政策を達成せしものと爲るが、其
結果如何の通商政策をされば通商法を達成せしる
所成る事。(第4回)

おおむねは、この成績又は(251)の元
本(252)が、アーティスト(253)と交換し、本田
トランク(254)と交換されるので、(255)
で取扱う。

支那の通商社、上海の紹興社にとまるで、西鐵路
内モ並進する合氣電氣水道電氣社によつて外國電
氣公司取扱事務の開拓は是なるので、その發展勢
況を察せりかのその時本社は、該公司の出資を期
することができた。

又、通路中の空氣は、重心が上にあって頭が下
位にとる呼吸位置の場合は、それほどなく、これで
呼吸されるとんびんとの間に火炎反応に適用する
呼吸細胞で呼吸器官の酸素を直接的に与えること
がで。又オランジの呼吸を説明することもできる
呼吸は、異常に興味である。

さらには荷物が簡単な手形であるので荷物を工場と
エントリの空港口を以て輸出されるのが普通である。

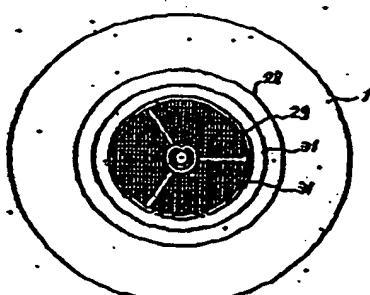
卷之三

第二回过夏威士、第三回故平西日、第四回

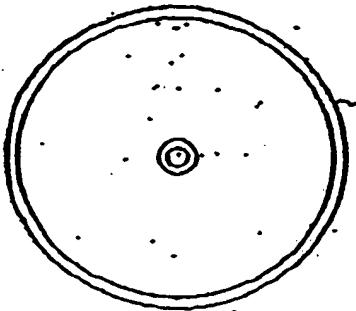
前項、味の濃さは第4—5項にかかる成績時間、
第6項にかかる一方の成績時間が、第7項
は第4項にかかる成績時間と大別する成績時間、第8項は第7項
にかかる成績時間と大別する成績時間、第9項は可成り、
大別の成績時間にかかる成績時間である。

西人
代理人
司理合絲
製絲工
場
三
號

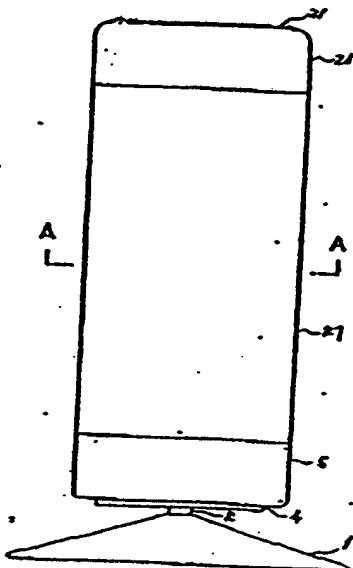
22



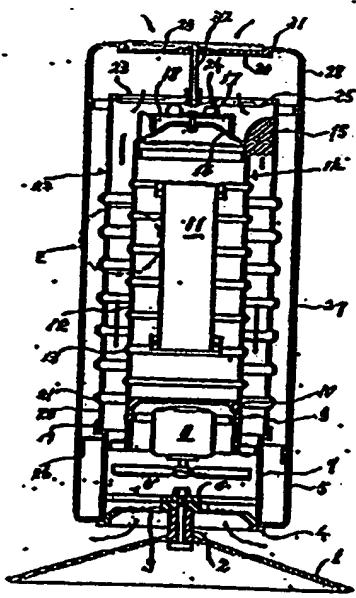
第3回



第 1 図



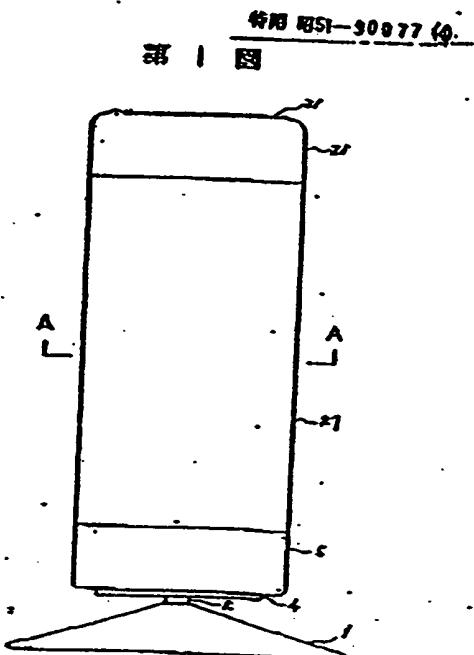
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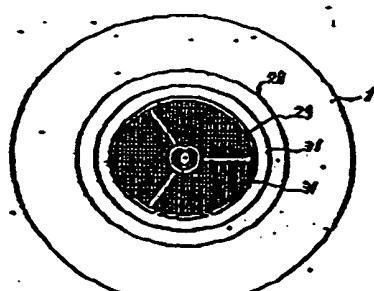
同様、筒状部材第2筒△一端端面に付属筒状部材
、又つ筒状部材の一方端面に付属筒状部材、筒状部
材は筒状部材の筒状部材の筒状部材、筒状部材の筒状部
材は筒状部材の筒状部材の筒状部材、筒状部材の筒状部
材は筒状部材の筒状部材の筒状部材、筒状部材の筒状部
材は筒状部材の筒状部材の筒状部材である。

出願人 有頭会社 第4工
代理人 三浦 勝

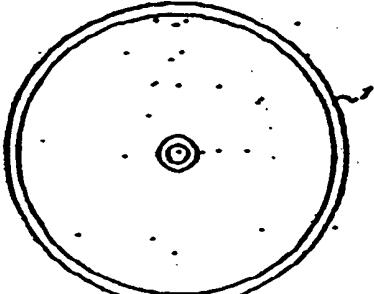
第一圖



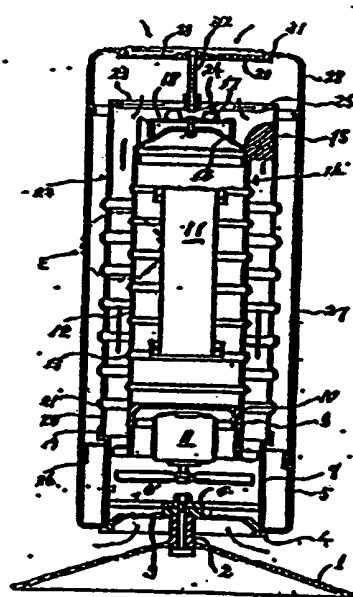
第二圖



第三圖



第四圖

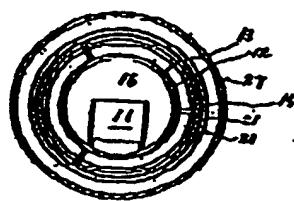


(5)

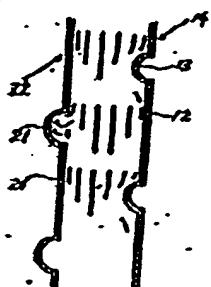
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特開昭61-90077 (5)

第5図



第6図



第7図



第8図



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